

## **REMARKS**

The specification of the subject U.S. patent application, as filed, as constituted by the verified translation of PCT/EP2005/050359, has been cancelled in favor of the concurrently submitted Substitute Specification. A suitable Abstract of the Disclosure has been added. These changes and additions do not constitute any new matter.

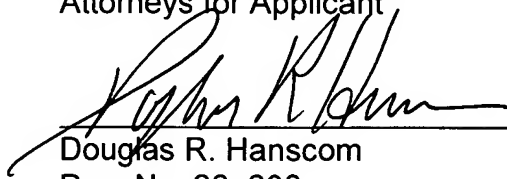
Original claims 1-86 and Article 19 claims 1-86 have been cancelled. New claims 87-169 have been added. New claims 87-169 are essentially the same, in scope, as the claims which are pending in the corresponding PCT application. They have been rewritten in a form more in accordance with U.S. practice and eliminating multiple dependencies.

Entry of this Preliminary Amendment into the file of the subject U.S. patent application, prior to an examination of the application on the merits, and prior to the calculation of the filing fee, is respectfully requested.

Respectfully submitted,

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**MARKED-UP COPY OF SPECIFICATION**  
**FAIST W1.2256 PCT-US**

**[Specification]**

**DEVICES FOR ADJUSTING CONTACT PRESSURE EXERTED ON AN  
ADJACENT ROTATING[ROTATIONAL] BODY BY A ROLLER IN A ROLLER  
STRIP AND/OR FOR ARRANGING THE[ENGAGING SAID] ROLLER ON THE  
ROTATIONAL BODY AND/OR FOR DISCONNECTING THE  
CYLINDER[DISENGAGING SAID ROLLER] FROM THE  
ROTATING[ROTATIONAL] BODY**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

[001] This patent application is the U.S. national phase, under 35 USC 371, of  
PCT/EP2005/050359, filed January 28, 2005; published as WO 2005/072965 A1  
on August 11, 2005 and claiming priority to DE 10 2004 004 665.4, filed January  
30, 2004, the disclosures of which are expressly incorporated herein by  
reference.

**FIELD OF THE INVENTION**

[002] The present invention is directed[relates] to devices that are used to adjust  
contact pressure exerted on an adjacent rotational body by a roller in a roller strip  
and/or to engage the[said] roller on the rotational body and/or to disengage said  
roller from the rotational body[, according to the preamble to claim 1, 6 or 22].  
Ends of the roller, or rollers which are adjustable, either in contact pressure or  
position, are seated in a support bearing having a roller mount that is capable of  
radial travel. Each of the support bearings has at least one actuator. The  
actuators are each controlled by separate control units.

### **BACKGROUND OF THE INVENTION**

[003] Devices[From DE 102 44 043 A1, devices] that are used to adjust rollers in a printing machine are known from DE 102 44 043 A1. Each[, wherein each] end of a roller<sub>1</sub> that exerts contact pressure on an adjacent rotational body<sub>1</sub> is seated in a support bearing having a roller mount that is capable of radial travel. Each[, with each] support bearing is being equipped with multiple actuators that act on the[said] roller and which can be pressurized with a pressure medium. A roller that can be displaced in this manner is also engaged, for example, against a forme cylinder.

[004] From DE 38 25 517 A1, a device for engaging and for disengaging rollers, and for adjusting inking unit and dampening unit rollers in a printing machine is known. A[, wherein a] stored-program controller automatically regulates the positioning of an inking or a dampening roller relative to a fixed distribution roller by the use[means] of an input, preset adjustment pressure. The stored-program controller issues a positioning command to an electrically activated actuator, and the actuator, which is configured[designed] as a direct current motor, transmits the positioning command to the positioning element, wherein that[said] positioning element is responsible for mechanically adjusting the inking roller or the dampening roller. The electrically activated actuator<sub>1</sub> and the positioning element are arranged in a roller lock of the adjustable inking or dampening unit roller. With the device known from DE 38 25 517 A1, a remote adjustment of the inking or the dampening rollers is possible. Beginning with an initial position for

the adjustable inking or dampening rollers, for different production types, adjustment values for other positions can be stored in the stored-program controller. Thus, the adjustment values for the inking or the dampening rollers are based upon the selected production type, with pre-set adjustment values for the different positions being determined based upon specific production types by the stored-program controller, by the use[means] of a program.

[005] [From ]WO 03/049946 A2 and the subsequently published WO 2004/028810 A1 disclose[.] methods for operating an inking unit or dampening unit of a printing machine. In[ are known, wherein in] the inking unit or in the dampening unit, at least three rollers or cylinders are provided, which can be placed against one another, thereby forming at least two adjacent roller strips. At[, and wherein at] least one of the rollers is seated in a machine frame such that it can be displaced relative to the other rollers. The displaceably seated roller is pressed into the gap between the adjacent rollers, with a degree of force that is adjustable in terms of its magnitude and its direction, in order to allow the variable adjustment of the respective contact pressure in the two roller strips.

### **SUMMARY OF THE INVENTION**

[006] The object of the present invention is directed to providing[to create] devices for adjusting contact pressure exerted on an adjacent rotational body by a roller in a roller strip and/or for engaging the[said] roller on the rotational body and/or for disengaging that[said] roller from the rotational body. A[, wherein the] width of the roller strip, which is formed between the roller and its adjacent

rotational body<sub>1</sub> can be adjusted as needed, even when the printing couple is running in production.

[007] The object is attained according to the invention by the provision of support for the ends of the rollers whose position or contact pressure is to be changed in support bearings having a roller mount which is capable of radial travel. Each one of the support bearings has at least one actuator that acts on the roller. At least one actuator in a support bearing is controlled by a control unit separately and independently of an actuator in another support bearing. The control unit determines the contact pressure exerted by one of the rollers, in at least one of the roller strips, on its adjacent rotational body from radial forces exerted by actuators in the same support bearing. A control element of the control unit allows the contact pressure to be changed [with devices having the characterizing features of claim 1, 6 or 22].

[008] The benefits that can be achieved with the present invention consist especially in that the contact pressure that is exerted on an adjacent rotational body<sub>1</sub> by a roller in a roller strip<sub>1</sub> can be individually adjusted as needed by [means of ]a control unit, especially by addressing individual actuators that play a part in the adjustment, and further in that an existing setting can be changed<sub>1</sub>, preferably remotely, such as, for example<sub>1</sub>, even when the printing couple is running in production. Because the contact pressure is adjustable, the width of the roller strip which is formed between the roller and its adjacent rotational body<sub>1</sub> can be adjusted as needed, which width adjustment capability produces a beneficial effect on the quality of the printed product that is produced with the

printing machine. The adjustment of the contact pressure is preferably accomplished by the use[means] of a support bearing, which is also called a roller lock, that is equipped with at least one actuator. In[, wherein in] each roller lock that plays a part in the adjustment of a roller, preferably multiple identifiable actuators are preferably arranged, which individual actuators are individually selectable and therefore can be individually actuated directly or indirectly by the control unit. Each[, wherein each] of the activated actuators exerts a radial force that is directed toward the interior of its roller lock. A[, wherein the] vector sum of the radial forces, preferably exerted by multiple actuators, form the contact pressure exerted by the roller on the adjacent rotational body. The[, wherein the] radial forces, which are exerted by the actuators, can preferably be adjusted separately and independently of one another, and are also set by the control unit for a desired operating position. The actuators, like the respective roller strips and the roller locks which are allocated to them, can each be clearly identified by the use[means] of an identification code. Actuators, which are connected to a common pressure source, can be activated in groups, but are preferably activated individually. Based on[upon] the arrangement of controllable devices and their respective connections, such as, for example, via conduits for transporting pressure medium, the actuators of a specific roller lock, which are connected to different pressure sources, can, for example, be activated together, while actuators of another roller lock that are connected to the same pressure sources remain inactive. In[Especially in] the case of a forme cylinder, which

[ that] is not completely covered with printing formes in an axial direction, the contact pressure that is exerted by a roller engaged against this forme cylinder can be set differently at the two axial ends of this roller. When the control unit receives the instruction, for example by the use[means] of a corresponding input via a control element that is a part of the control unit, to change the setting of the contact pressure in a selected roller strip, the control unit calculates the amount of pressure that should be applied to which actuator in the affected roller lock, and implements whatever adjustment may be necessary in the pressure setting, such as, for example, by actuating one or more controllable devices in order to adjust the pressure in selected actuators. To implement the contact pressure whose value is to be adjusted, the control unit controls valves, which are preferably arranged in the pressure conduits, and which may preferably be[especially] rapid-reaction, electrically or electromagnetically actuatable proportional valves. An[, so that an] adjustment of a contact pressure value can thus be implemented within a few seconds.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

[009] Preferred[Exemplary] embodiments of the present invention are represented in the drawings and will be described in greater detail below.

[010] The drawings show:

Fig. 1, a schematic side elevation view of[in a cross-section,] a printing couple comprising an inking unit and a dampening unit, each with rollers that are adjustable in terms of their contact pressure; in

Fig. 2, a schematic side elevation view of[in a cross-section,] a printing couple comprising an inking unit and a dampening unit, each with rollers that are adjustable in terms of their contact pressure, wherein in the inking unit, two rollers that are adjustable in terms of their contact pressure are engaged against one another; in

Fig. 3, a cross-sectional view[ longitudinal section] of a roller lock in accordance with the present invention; in

Fig. 4 a perspective view of the roller lock of Fig. 3, partly in cross-section, taken[with a partial longitudinal section] in two orthogonal perpendicular planes; in

Fig. 5, a schematic representation of radial forces exerted by actuators on an[a] adjustable roller without a displacement of the adjustable roller; in

Fig. 6, a schematic representation of radial forces exerted by actuators on an[a] adjustable roller with a displacement of the adjustable roller; and in

Fig. 7, a schematic depiction of a pneumatic layout for activating actuators and fixation devices that are components of a printing couple.



### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[011] Referring initially to Fig. 1, there may be shown[Fig. 1 shows], in a schematic, simplified, side elevation[cross-sectional] representation, a first printing couple 01 comprising an inking unit 02 and a dampening unit 03, each with rollers 04; 06; 07; 08; 09; 11 that are adjustable with respect to[in terms of] their contact pressure. The rollers 04; 06; 07; 08; 09; 11, which[ that] are adjustable, in terms of their contact pressure, are seated such that they can be displaced. In this depicted preferred embodiment illustrated example, each of these adjustable rollers 04; 06; 07; 08; 09; 11 is in direct contact with two adjacent rotational bodies 12; 13; 14; 16; 17. In[, in] other words, each of these rollers 04; 06; 07; 08; 09; 11 is simultaneously engaged with[on] two of the rotational bodies 12; 13; 14; 16; 17 which are provided in this arrangement. The result is[, so] that each of these rollers 04; 06; 07; 08; 09; 11 has, on its circumferential surface, two roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, which may also be called nip-points N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, and which extend essentially axially relative to the respective roller 04; 06; 07; 08; 09; 11. Each roller that is adjustable in terms of its contact pressure 04; 06; 07; 08; 09; 11, presses, through[ in] its respective roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, and with an adjustable level of contact pressure, against its adjacent rotational bodies 12; 13; 14; 16; 17. The roller 04 is configured[designed], for example, as a dampening forme roller 04, and forms its

first nip-point N11 with a rotational body 12, which is configured[designed], for example, as a cylinder 12, and especially as a forme cylinder 12. Roller 04[, and] forms its second nip-point N12 with a rotational body 13, which is structured[designed], for example, as a dampening distribution roller 13. The roller 06 is[ designed], for example, [as ]an ink forme roller 06, and forms its first nip-point N21 with the forme cylinder 12, and forms a[its] second nip-point N22 with a rotational body 16, such as[ designed], for example, [as ]an ink transfer roller 16. The roller 07 is also structured as[designed], for example, [as ]an ink forme roller 07 and forms its first nip-point N31 with the forme cylinder 12 and its second nip-point N32 with the ink transfer roller 16. In the dampening unit 03, [for example ]a further roller 08 that is adjustable, with respect to[ in terms of] its contact pressure, is provided, such as, for example, as an intermediate roller 08, which forms its first nip-point N41 with the dampening distribution roller 13 and its second nip-point N42 with another dampening unit roller 14. In the inking unit 02, [for example ]two additional rollers 09 and 11 that are adjustable in terms of their contact pressure are provided, and are for example, two intermediate rollers 09 and 11. The intermediate inking[, wherein the] roller 09 forms its first nip-point N51 with the ink transfer roller 16 and its second nip-point N52 with another inking unit roller 17. The intermediate inking[, and the] roller 11 forms its first nip-point N61 with the ink transfer roller 16 and its second nip-point N62 with the other inking unit roller 17.

[012] A similar, second[The] printing couple 01 is[also] illustrated, also schematically, also in side elevation[cross-section] in Fig. 2 and

includes[comprising] an inking unit 02 and a dampening unit 03, each with rollers 04; 06; 07; 08; 09; 11 that are adjustable in terms of their contact pressure. This second printing couple[,] differs from the first printing couple 01 shown in Fig. 1 in the positioning of the intermediate inking roller 11 in the inking unit 02. In the second printing couple 01 shown in Fig. 2, the intermediate inking roller 11 is not in direct contact with the ink transfer roller 16 at its first nip-point N61. Rather, [, rather] the intermediate inking roller 11 is engaged against the other intermediate inking roller 09, so that [the ]roller 09 forms its second nip-point N52 not with the additional inking unit roller 17, but with the intermediate inking roller 11. Thus, in this example, the nip-points N52; N61 both designate the same roller strips N52; N61. In the arrangements shown in Fig. 1 and 2, the adjustable rollers 04; 06; 07; 08; 09; 11 each have two nip-points N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62. However, in the printing couple 01, an operational position for at least one of these adjustable rollers 04; 06; 07; 08; 09; 11 can also be provided, in which the at least one adjustable[said] roller 04; 06; 07; 08; 09; 11 is in direct contact with only one adjacent rotational body 12; 13; 14; 16; 17, and is disengaged from its second adjacent rotational body 12; 13; 14; 16; 17. A further operational position for at least one of the adjustable rollers 04; 06; 07; 08; 09; 11 can provide that the at least one[said] adjustable roller 04; 06; 07; 08; 09; 11 is disengaged from all of its adjacent rotational bodies 12; 13; 14; 16; 17, while each of the remaining adjustable rollers 04; 06; 07; 08; 09; 11 in this printing couple 01 is in direct contact with at least one adjacent rotational body 12; 13; 14; 16; 17. It is also possible for only one adjacent rotational body

12; 13; 14; 16; 17 to be provided for at least one of the adjustable rollers 04; 06; 07; 08; 09; 11 in the printing couple 01.

[013] The printing couple 01 is arranged in a printing machine that produces a printed product. The[, wherein the] printing machine is configured[designed], for example, as a newspaper printing press and is equipped, for example, with multiple ones of the printing couples 01, each of which is provided with at least one inking unit 02 and/or with one dampening unit 03. The printing couple 01 can operate[s], for example, in a planographic printing process, and preferably can operate in an offset printing process. A[, wherein a] transfer cylinder that is part of the printing couple 01, and an impression cylinder that operates in conjunction with the transfer cylinder, are not specifically represented in Fig. 1 and 2. The dampening unit 03 is omitted when the printing couple 01 is to be used in a dry offset printing process.

[014] The circumferential surface of the rotational body 12, which is configured [, 13; 14; 16; 17 designed], for example, as a forme cylinder 12, is covered with at least one printing forme which is [(]not specifically shown[)]. Preferably, multiple printing formes, and especially four or six printing formes, are arranged in an axial direction on the forme cylinder 12. In the circumferential direction of each forme cylinder 12, for example, two printing formes are arranged in tandem, so that a total of up to eight or twelve printing formes can be arranged on the circumferential surface of the same forme cylinder 12. The printing couple 01 can have a total of significantly more, but can also have fewer adjustable rollers 04; 06; 07; 08; 09; 11 in its inking unit 02 and in its dampening unit 03 than the

number of such adjustable rollers which are shown, by way of example, in Fig. 1 and 2.

[015] In each[the] area of direct contact between rollers 04; 06; 07; 08; 09; 11 and rotational bodies 12; 13; 14; 16; 17 which are engaged on one another, a flattened area is formed on the cylindrical, circumferential surface of the roller 04; 06; 07; 08; 09; 11, on the cylindrical, circumferential surface of the rotational body 12; 13; 14; 16; 17, or of both. A[, with the] chord of the flattened area corresponds[corresponding] to the width of the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 that extends on the circumference of the roller 04; 06; 07; 08; 09; 11 or of the rotational body 12; 13; 14; 16; 17. The flattening of the otherwise cylindrical circumferential surface of the roller 04; 06; 07; 08; 09; 11 or of the rotational body 12; 13; 14; 16; 17 is possible because the roller 04; 06; 07; 08; 09; 11, or its adjacent rotational body 12; 13; 14; 16; 17, or both, have an elastically deformable circumferential surface. For example, the adjustable rollers 04; 06; 07; 08; 09; 11 preferably each have a rubberized circumferential surface.

[016] To[In practice, in order to] achieve a high quality of the printed product to be produced using the printing couple 01, it is necessary to set the roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 which are present in the printing couple 01, each to a specific width, with that specific[said] width lying within the range of a few millimeters and amounting, for example, to between 1 mm and 10 mm. The rollers 04; 06; 07; 08; 09; 11 that can be adjusted, in terms of their contact pressure, and their adjacent rotational bodies

12; 13; 14; 16; 17 each have a diameter of, for example, 100 mm to 340 mm and an axial length of, for example, [of ]between 1,000 mm and 2,400 mm. The width of the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 corresponds to the contact pressure, which is exerted by the respective adjustable roller 04; 06; 07; 08; 09; 11, on its adjacent rotational body 12; 13; 14; 16; 17 in the respective roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62.

[017] Each roller 04; 06; 07; 08; 09; 11, that can be adjusted in terms of its contact pressure, is seated at least at one of its ends 18, and[but] preferably at both of its ends 18, in a support bearing 21. The support bearing 21 has[ having] a roller mount 39 that is capable of radial travel, or in other words, in a so-called roller lock 21. Each[, wherein each] support bearing 21 or roller lock 21 has at least one and preferably has multiple actuators 22 that act upon the supported[said] roller 04; 06; 07; 08; 09; 11. The[, wherein the] actuators 22, in turn, are preferably arranged in a housing which[that] is a component of the support bearing 21 or roller lock 21. Each actuator 22[, and] can [each ]be pressurized, for example, with a pressure medium. In the discussion which[what] follows, although the actuators 22 are described as actuators 22 that can be pressurized with a pressure medium, which description corresponds to their preferred embodiment, the to be-[hereinafter] described control of the support bearings 21 and/or of their actuators 22 is independent of the medium that is used to exert the contact pressure. To implement the appropriate[ proposed] control, in accordance with the present invention, the actuators 22 can also be

configured[designed], for example, as actuators 22 that exert the respective contact pressure, [for example, ]on the basis of, for example, hydraulic, electric, motor-driven or piezoelectric action. In any case, activated actuators 22 cause the roller mount 39 to move eccentrically relative to the support bearing 21, within a plane that extends orthogonally to the axial direction of the adjustable roller 04; 06; 07; 08; 09; 11. The[In this, the] radial travel of the roller mount 39, relative to the support bearing 21 can occur in a linear or non-linear path of motion.

[018] A[The] permissible radial travel of the roller mount 39 in the roller support bearing 21, which roller support bearing 21 is, for example, stationary, thus causes an eccentric displacement of the roller mount 39 in the support bearing 21, which is preferably configured[designed] as a radial bearing. In Fig. 3, and in Fig. 4 a roller lock 21 is represented by way of example. Fig. 3 shows the roller lock 21 in a longitudinal section that runs parallel to the axis 19 of the roller 04; 06; 07; 08; 09; 11. Fig. 4 shows the roller lock 21 of Fig. 3 from a perspective view with a partial longitudinal section that is taken in two orthogonal, perpendicular planes. At[It can be provided that at] least each roller 04; 06; 07, which[ that] operates directly in conjunction with a forme cylinder 12, has at least one actuator 22, which one actuator is controlled independently of the other actuators 22 of each of the rollers 04; 06; 07 that also operate directly in conjunction with the forme cylinder 12. Preferably, it is provided that at least three rollers 04; 06; 07, that all operate directly in conjunction with the forme cylinder 12, are provided, and that each of these rollers 04; 06; 07 has at least one independently controlled actuator 22.

[019] The housing of the roller lock 21 includes[has] a sleeve-shaped frame holder 23, inside of which a roller holder 24 is seated. The[, wherein the] actuators 22, when they are activated, act upon the roller holder 24 and can displace the roller holder 24 radially, in a gap that is formed radially around the axis 19, between the frame holder 23 and the roller holder 24. The width of the gap between the frame holder 23 and the roller holder 24 measures, for example, from 1 mm to 10 mm, and preferably is approximately 2 mm. The actuators 22 are arranged, for example, in the gap between the frame holder 23 and the roller holder 24, or in a chamber or recess in the frame holder 23. Each[, with the] actuator 22 that is arranged in the chamber or recess in the frame holder 23 has[having] an active surface 38 that faces the roller holder 24, with which the actuator 22 exerts surface pressure on the roller holder 24 when that[said] actuator is in its operational state, in which operational state it is pressurized by a pressure medium.

[020] The actuators 22 are preferably arranged in the housing, or sleeve-shaped frame holder, of the roller lock 21 so as to be non-rotatable relative to this housing, or at least relative to the frame holder 23. Each of the actuators 22 is structured[designed], for example, as a tubular component, such as a pressure hose, that can be pressurized with a pressure medium. The[, wherein the] tubular component has at least one surface 38, as seen in [(Fig. 4)], which is made of a reversibly deformable elastomeric material, with that[said] surface 38 being configured[designed] in a further embodiment that is not significantly shown here, as a membrane. When[, wherein when] the tubular component is pressurized



with the pressure medium, that [said] membrane 38 preferably comes to rest against an outer circumferential surface of the roller holder 24. The reversibly deformable surface 38 thus conforms, at least largely, to the surface 38 of the actuator 22 that effectively exerts the surface pressure. In the preferred embodiment, [preferred here] the actuators 22 have no pistons, which are guided in a cylinder, and no piston rod. The integration of the actuators 22 into the housing of the roller lock 21 clearly results in an extremely compact construction of the roller lock 21. The pressure medium is supplied to each of the actuators 22 via a pressure conduit 41, as is depicted in [(Fig. 4)].

[021] One of the ends 18 of the roller 04; 06; 07; 08; 09; 11 that is adjustable, in terms of its contact pressure, is seated in the roller mount 39, which is, for example, semicircular, as may be seen in Fig. 4, and which is preferably configured [designed] as a quick-release coupling, and which is rigidly connected to the roller holder 24. Each, wherein each] of the rollers 04; 06; 07; 08; 09; 11, that are adjustable in terms of its [their] contact pressure, is capable of rotating on its own axis 19. As an alternative to the rigid connection of the roller mount 39 to the end of the roller 04; 06; 07; 08; 09; 11, the roller mount 39 can have a bearing, such as a roller bearing or a plain bearing, in which the end of the roller 04; 06; 07; 08; 09; 11 is rotatably seated. The sleeve-shaped frame holder 23 is attached, for example, to a side frame 36 of the printing couple 01. The roller lock 21 is sealed against dust, moisture and other contaminants by [means of] a sealing element 37 that preferably covers especially the gap between the frame holder 23 and the roller holder 24, and that is situated at the end surface of the

roller lock that faces the roller 04; 06; 07; 08; 09; 11 which[that] is adjustable in terms of its contact pressure. The[, wherein the] sealing element 37 is attached to the frame holder 23, for example, via screws which are depicted in Fig. 4. With the inclusion of the sealing element 37, especially the actuators 22 are also protected against contamination and thus are protected against any impairment of their mobility. The radial displacement of the roller holder 24 in the frame holder 23 also allows a roller 04; 06; 07; 08; 09; 11 to be engaged on its adjacent rotational body 12; 13; 14; 16; 17, or to be disengaged from it.

[022] The roller lock 21 is equipped, for example, with a fixation device, which immobilizes the roller holder 24, and thus also immobilizes[with it] the roller 04; 06; 07; 08; 09; 11 that is rigidly connected to it[thereto], in a first operational position, thereby locking it in place against any radial displacement relative to the frame holder 23. In[, or, in] a second operational position, the fixation device releases the roller holder[it] for such radial displacement relative to the frame holder 23. The fixation device comprises, for example, a preferably coaxial first multi-plate assembly 26 that is rigidly connected[, for example,] to, for example, the roller holder 24, and also comprises a[an also] preferably coaxial second multi-plate assembly 27. Plates[, wherein the plates] of the second multi-plate assembly 27 engage or interdigitate between the plates of the first multi-plate assembly 26. The immobilization is accomplished by the plates meshing with one another, preferably frictionally or positively. Once the frictional or positive contact of the plates has been released, the second multi-plate assembly 27 is capable of moving in the axial direction of the roller lock 21.

[023] Axial[The axial] movement of the second multi-plate assembly 27 is accomplished, for example, in that a pressure medium is supplied through a channel 28 that is formed in the side frame 36, into a pressure chamber 29 which is located in the roller lock 21. A[, wherein a] pressure plate 31, which is arranged in the pressure chamber 29, moves a plunger 33, which is preferably arranged in the roller holder 24, axially, against the force of a spring element 32. The second multi-plate assembly 27 is fastened to a plunger head 34 of the plunger 33, and is thus also moved with the axial movement of the plunger 33, thereby causing the plates in the multi-plate assemblies 26; 27 to become disengaged from each other. When the pressure exerted on the pressure plate 31 by the pressure medium in the pressure chamber 29 is switched off, the force exerted by the spring element 32 guides the plates of the multi-plate assemblies 26; 27 back into engagement with one another, thereby immobilizing the roller holder 24, which, as discussed above, can be radially displaced relative to the frame holder 23 by the actuators 22 in the roller lock 21, in the frame holder 23.

[024] In the preferred embodiment[example] shown in Fig. 1 through 4, each roller lock 21 is equipped with four actuators 22, which are arranged in a circular pattern around the axis 19 of the roller 04; 06; 07; 08; 09; 11. These four [, wherein the] actuators 22 are preferably distributed, with equal spacing, around the axis 19 of the roller 04; 06; 07; 08; 09; 11 that is adjustable in terms of its contact pressure. The actuators 22 are remotely controllable. In[, in] other words, actuators 22[ they] can be activated by the use[means] of a control unit which is not specifically depicted, and are preferably configured[designed] as

pneumatic actuators 22. A compressed[prestressed] gas, preferably compressed air, is used as the pressure medium, for example. Possible alternatives to the preferred pneumatic actuators 22 are especially hydraulic actuators 22, which[ that] are impinged upon by a fluid, or electromotive actuators 22. As is shown in Fig. 5 and 6 in a schematic representation, each actuator 22, when it has been pressurized with a pressure medium, exerts a radial force  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$ , directed toward the interior of its roller lock 21, on the roller 04; 06; 07; 08; 09; 11 that is connected to the roller lock 21 and which radial force is adjustable in terms of its contact pressure. The[, wherein the] actuators 22 are preferably radially supported against or in the frame holder 23 of the roller lock 21, and exert the radial force  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  on the roller 04; 06; 07; 08; 09; 11, which is attached to the roller holder 24 and which radial force is adjustable in terms of its contact pressure. This is accomplished[,] by exerting the surface pressure on the roller holder 24 that is arranged in the frame holder 23 such that the roller holder 24[it] can be radially displaced. Accordingly, the pressure exerted by the pressure medium in the respective actuator 22 and the radial force  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  of that[said] actuator 22 correspond to one another. Radial forces  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  exerted simultaneously by the plurality of actuators 22 situated in the same roller lock 21 form an opening angle  $\alpha$  with one another, which opening angle  $\alpha$  deviates from  $0^\circ$  and  $180^\circ$ , preferably lying between  $45^\circ$  and  $135^\circ$ , and is, for example,  $90^\circ$ . The contact pressure that is exerted on an adjacent rotational body 12; 13; 14; 16; 17 by a roller 04; 06; 07;

08; 09; 11, which is adjustable in terms of its contact pressure, in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 then is a result of results as] a vector sum of the radial forces  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  that are exerted simultaneously by the actuators 22 in one roller lock 21, and, [ -] if applicable, taking into account a force of weight that is at least partially exerted on the adjacent rotational body 12; 13; 14; 16; 17 by the adjustable roller 04; 06; 07; 08; 09; 11, as a function [ on the basis] of its own mass.

[025] With an identifying element "n" in the radial force designator  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  a specific roller lock 21 can be designated and therefore identified. Further discussion of the significance of the identifying element "n" will be addressed below. Preferably, each roller lock 21 that is built into the printing machine, and which is a component of an adjustable roller 04; 06; 07; 08; 09; 11, is assigned an identification code that can be used in the control process as an address with which the roller lock 21 can be clearly identified in the printing machine or at least in a printing couple 01, and which roller lock 21 can thereby be selected in the control process. In the same manner, each actuator 22 that is a part of a roller lock 21, is also assigned an identification code. This identification code insures that, [ with which] each actuator 22 in one of the roller locks 21 that are arranged in the printing machine or in the respective printing couple 01 can be clearly identified, selected, and controlled. Furthermore, as with the above-described identification codes, the pressure chamber 29 that is part of the fixation device of each roller lock 21 is assigned an identification code. Each, [ whereby ultimately each] fixation device for the roller locks 21 that are

arranged in the printing machine or in the printing couple 01 can be clearly identified. The respective identification code for each of the roller locks 21, their actuators 22 and their fixation device is preferably machine readable and can be stored in the control unit, which control unit is preferably an electronic control unit that processes digital data.

[026] In the preferred embodiment which is[example] shown in Fig. 1 through 4, the identification code for the actuators 22 and the fixation device of each roller lock 21 consists of a series of numerals, with a[the] first numeral designating the relevant roller lock 21 and with a[the] second numeral designating the relevant actuator 22 in the respective roller lock 21 or its fixation device. Thus, each identification code nm, with an identifying element n; m for the roller lock 21, its actuators 22 and its fixation device, designates a clearly specified roller lock 21 in the printing couple 01, a clearly specified actuator 22 in the printing couple 01, and a clearly specified fixation device in the printing couple 01. The[ In this, the] identification code nm thus specifies a roller lock 21 with its first identifying element n, and a specific actuator 22 in this roller lock 21, or its fixation device, with its second identifying element m. For example, the identification code "12" consisting, for example, of a two-digit number, designates with its first numeral the roller lock 21 identified by the number "1", which in the example shown in Fig. 1 through 4 is assigned to the dampening forme roller 04. The[, while the] second numeral in the numeric sequence, which in this case was selected as the number "2", designates a very specific actuator 22 in the roller lock 21 identified by the number "1". The identification code "15" in this example designates the fixation

device of the roller lock 21 that is designated by the number "1". In the example shown in Fig. 1 through 4, the identification code nm relates to numeric sequences comprised of a first identifying element "n" comprising a number between "1" and "6", because six roller locks 21 requiring differentiation are provided, and a second identifying element "m" comprising a number between "1" and "5" for the four actuators 22 for each[per] roller lock 21 and the allocated fixation device. Because each roller lock 21, each of its actuators 22, and each fixation device in the printing couple 01 is assigned an identification code nm, each roller lock 21, each actuator 22 and each fixation device can be clearly identified and addressed. The identification codes nm can each be stored, for example, in the control unit as an individual, unambiguous address, with which each roller lock 21, each actuator 22 and each fixation device can be identified, selected, addressed and controlled by the control unit, separately and independently of other roller locks 21, actuators 22 and fixation devices arranged in the printing couple 01.

[027] When both ends 18 of the same roller 04; 06; 07; 08; 09; 11, that can be adjusted in terms of contact pressure and/or its position, can be changed, and/or when at least one end 18 of two different rollers 04; 06; 07; 08; 09; 11, that can each be adjusted in terms of contact pressure and/or their positions, can be changed, and when both such ends are each seated in a support bearing 21, in other words in a roller lock 21 having a roller mount 39 that is capable of radial travel, with each support bearing 21 having at least one actuator 22 that acts upon the roller 04; 06; 07; 08; 09; 11, the control unit controls at least the

actuator 22 of at least the two support bearings 21 supporting the roller ends 18 separately and independently of other support bearings 21 and actuators 22.

The control unit accordingly controls at least one actuator 22 in a support bearing 21 separately and independently of an actuator 22 in another support bearing 21.

The control unit can also control groups of actuators 22 and support bearings 21 together, particularly[especially] if these jointly controlled actuators 22 and support bearings 21 form a functional system, or if, in other words, and based upon their technical function in the printing process, these actuators 22 and support bearings 21[ they] must continuously and necessarily be positioned in a fixed arrangement relative to one another.

[028] The at least two actuators 22 in each roller lock 21 are always arranged the same in their preferably circular distribution in each roller lock 21, with respect to a specific position of the roller lock 21, so that in all of the roller locks 21 in a printing couple 01, the identifying element "m" for its actuators 22 and its fixation device can always be assigned in the same order. Accordingly, the same identifying element "m" is always assigned to actuators 22 occupying the same position in this sequence. For example, the actuators 22 and the fixation device are identified in ascending order, with the identification code for the fixation device being assigned the highest value in this order. The actuators 22 in each roller lock 21 are thereby designated in a fixed order. For example, starting from a specific position on the circumference of the roller lock 21, the actuators 22 in each roller lock 21 are designated in the same fixed order in the circumferential direction.



[029] In each roller lock 21, the actuators 22, in their preferred pneumatic embodiment, are each connected via a pressure conduit 41 to a pressure source, such as a compressor, with a pressure level 42. As is apparent from the pneumatic layout shown in Fig. 7, it can be provided that actuators 22 arranged in different roller locks 21, which, due to their identical arrangement in their respective roller lock 21, are assigned the same identifying element m, are connected in parallel via the same pressure conduit 41 to the same pressure source or are maintained at least at the same pressure level 42. Actuators 22 that are arranged in the same roller lock 21, but which are assigned a different identifying element "m", are connected via different pressure conduits 41 to different pressure sources or at least are maintained at different pressure levels 42.

[030] It can be provided that the actuators 22, which are arranged in the roller locks 21, are constantly pressurized, and that the incoming pressure acts to displace the adjustable roller 04; 06; 07; 08; 09; 11 and/or acts as a contact pressure exerted on the adjustable roller 04; 06; 07; 08; 09; 11 that is to be changed, only if, and for as long as the fixation device of the relevant roller lock 21 is released. In, in] other words, it is in the operating position that will permit the displacement of the adjustable roller 04; 06; 07; 08; 09; 11. If, and for as long as the fixation device of the relevant roller lock 21 is restricting the displacement of the adjustable roller 04; 06; 07; 08; 09; 11, pressure which is acting on at least one of the actuators 22, or a change in the[said] incoming pressure, will have no effect on the adjustable roller 04; 06; 07; 08; 09; 11. If, and for as long as no

effect on the adjustable roller 04; 06; 07; 08; 09; 11 is intended, the pressure conduits 41 to the actuators 22 that operate in conjunction with this roller 04; 06; 07; 08; 09; 11, instead of being continuously pressurized, can also be set to be at least partially pressureless or at least substantially pressure-reduced.

[031] Roller locks 21 that are connected to, and that support the same roller 04; 06; 07; 08; 09; 11 that is adjustable, in terms of its contact pressure, preferably each have the same number of actuators 22. As in the example described here, the roller locks 21 of multiple or even all the rollers 04; 06; 07; 08; 09; 11 that can be adjusted, in terms of their contact pressure, can have the same number of actuators 22. In a printing couple, a side frame 36, in, or on which, a first support point for the rollers 04; 06; 07; 08; 09; 11, which [that] are adjustable in terms of contact pressure, along with their adjacent rotational bodies 12; 13; 14; 16; 17, is located, is customarily designated as "Side I". An [, and the] opposite side frame 36, with a second support point for the rollers 04; 06; 07; 08; 09; 11 that are adjustable in terms of their contact pressure, along with their adjacent rotational bodies 12; 13; 14; 16; 17, is customarily designated as "Side II".

[032] In [accordance with ]the prior art, actuators 22 in roller locks 21 that are connected to the same roller 04; 06; 07; 08; 09; 11 exert an equal level of contact pressure on the adjacent rotational body 12; 13; 14; 16; 17 at both ends 18 of that[said] roller 04; 06; 07; 08; 09; 11 in the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62. If, however, the rotational body 12, which is configured[designed] as a forme cylinder 12, is not evenly covered with printing formes in its axial direction, and instead that[the] forme cylinder 12 is, for

example, only half covered or at least is not continuously covered with printing formes, it is advantageous, in accordance with the present invention, to be able to set the contact pressure that is exerted on the forme cylinder 12 at the two ends 18 of the same roller 04; 06; 07; 08; 09; 11 at different levels. In this case, the vector sum of the radial forces  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  of the actuators 22 in the roller lock 21 on "Side I" will differ from the vector sum of the radial forces  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  of the actuators 22 in the roller lock 21 on "Side II".

[033] In the preferred embodiment[example shown in Fig. 7] of a pneumatic circuit for the actuators 22, as shown in Fig. 7, in all of the roller locks 21 which are arranged in the printing couple 01, are preferably either electrically or electromagnetically activated, controllable devices which are arranged in the pressure conduit 41 that leads from the pressure source, which[ said] devices are[being] preferably configured[designed] as rapid-reaction proportional valves EP1; EP2; or EP3; EP4, such as, for example, 3/3-way proportional valves EP1; EP2; EP3; EP4. These valves[,] determine the pressure level 42 that is present at the respective actuators, and wherein, for example, one of the proportional valves EP1; EP2; EP3; EP4 is allocated to each roller lock 21. The[, wherein the] control unit activates actuators 22, which are arranged in the roller locks 21, via the proportional valves EP1; EP2; EP3; EP4. Two additional controllable devices [that] are provided in the circuit, which preferably are configured[designed] as electrically or as electromagnetically actuatable valves EP5; EP6, such as, for example, as 5/2-way valves, and which are arranged in the pressure conduit 41 on the pathway of the pressure medium from its pressure source to the actuators

22 in a series connection, downstream from one of the proportional valves EP1; EP2; EP3; EP4. These 52-way valves[.] allow the selection of whether actuators 22 on "Side I" of the roller 04; 06; 07; 08; 09; 11, that is adjustable in terms of its contact pressure, will be pressurized at the same pressure as "Side II", or at a different pressure. The pressure level 42 can be adjusted by the use[means] of the proportional valves EP1; EP2; EP3; EP4 to any level, such as for example, between 0 bar and 10 bar, and preferably between 0 bar and 6 bar.

[034] The fixation devices 28; 29; 31; 32; 33; 24 for the roller locks 21 of the same roller 04; 06; 07; 08; 09; 11 are, for example, connected in parallel in their respective pressure conduit 41, and thus preferably change their operating position at the same time. With preferably also electrically or electromagnetically actuated valves V15; V25; V35; V45; V55; V65, such as, for example, 3/2-way valves V15; V25; V35; V45; V55; V65, each fixation device is placed either in a first operational position, in which the fixation device blocks the essentially radial displacement of the roller 04; 06; 07; 08; 09; 11 that is adjustable in terms of its contact pressure, or is placed in a second operational position, in which the fixation device permits the essentially radial displacement of the roller 04; 06; 07; 08; 09; 11 that is adjustable in terms of its contact pressure.

[035] As an alternative to, or in addition to the circuit for the actuators 22 shown in Fig. 7, a controllable device can be allocated to each roller lock 21. Such a [, wherein said] controllable device can apply[applies] pressure to multiple, and to preferably all, pressure conduits 41 for actuators 22 in the same roller lock 21 at the same time, with these pressure[said] conduits 41 being connected to their

respective pressure sources, at a first pressure level 42 in a first operational position and at a second pressure level 42 in a second operational position. In [ , wherein in] both of the operational positions, the pressure level 42 that exists at the actuators 22 in each case is different from zero for at least one of the actuators 22 in the same roller lock 21. All of the actuators 22 in one roller lock 21 are thereby pressurized at the same time, at their respective pressure levels 42, which preferably differ from one another in the two operational positions of the controllable device.

[036] In the two operational positions of the controllable device, the pressure level 42 that exists at multiple ones of, or at all actuators 22 in one roller lock 21 is also completely different, so that each of the actuators 22 in one roller lock 21 is pressurized at a different pressure level 42. Actuators 22, which are designated by the same identifying element "m" in different roller locks 21, can have the same pressure level 42, while actuators 22 in the same roller lock 21 having different identifying elements "m" as a rule have different pressure levels 42. The switch between the first operational position and the second operational position is preferably made abruptly via a switching operation of the controllable device, as initiated by the control unit. Accordingly, the controllable device acts on pressure conduits 41 that lead to all actuators 22 in the same roller lock 21 in the same manner, and can comprise, for example, a flow-check valve having multiple passageways that are independent of one another, or multiple synchronously, or in other words, simultaneously, switched flow-check valves, or a switching position for the proportional valves EP1; EP2; EP3; EP4. Because

the adjustment of all of the actuators that are involved in the switch is performed simultaneously, or in other words, is performed synchronously, the adjustment of contact pressure that is exerted on an adjacent rotational body 12; 13; 14; 16; 17 by a roller 04; 06; 07; 08; 09; 11 in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 occurs rapidly, or, in other words, occurs within a very short period of time. In this manner, during an adjustment of the setting of the inking unit 02 or the dampening unit 03, especially when the printing couple is running in production, an unstable operating condition, that tends to lead to[toward] vibrations, is prevented. If multiple rollers 04; 06; 07; 08; 09; 11 each seated in roller locks 21 are provided, with each roller lock 21 having an identifying element "n", the control unit selects the controllable device that is allocated to each roller lock 21 in each case based upon the identifying element "n".

[037] The printing couple 01 can have a standard configuration with respect to the contact pressure exerted by rollers 04; 06; 07; 08; 09; 11, with that[said] standard configuration comprising a set of values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62, wherein each such value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 corresponds to a contact pressure exerted by a roller 04; 06; 07; 08; 09; 11 of this printing couple 01 in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 on a rotational body 12; 13; 14; 16; 17 that is adjacent to the respective roller 04; 06; 07; 08; 09; 11. The standard configuration can, for example, consist of numerical values, of value pairs or of value sequences which

are listed in a table or graphic. The<sub>1</sub>, wherein the<sub>1</sub> control unit accesses these numerical values, value pairs or value sequences using a program intended<sub>1</sub>[designed] for adjusting a desired contact pressure, which program is run in the control unit, and which uses these numerical values, value pairs or value sequences to adjust the desired contact pressure.

[038] In the preferred embodiment<sub>1</sub>[example] shown in Fig. 1, 2 and 7, six rollers 04; 06; 07; 08; 09; 11 that are adjustable in terms of their contact pressure, with a total of twelve roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, are provided in the printing couple 01. Each<sub>1</sub>, wherein each<sub>1</sub> roller 04; 06; 07; 08; 09; 11, that is adjustable in terms of its contact pressure<sub>1</sub>, is seated in a roller lock 21 having four actuators 22. Taking into account the option of being able to set contact pressures of different values on "Side I" and "Side II" of the printing couple 01, the standard configuration for this printing couple 01 can comprise a set of twenty-four values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62. For each of these roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressure being exerted therein is<sub>1</sub> in each case<sub>1</sub> formed from a vector sum of the radial forces Fn1; Fn2; Fn3; Fn4 which are exerted simultaneously by actuators 22 in the same roller lock 21, and if applicable<sub>1</sub> taking into account the force of weight which is exerted<sub>1</sub> at least partially<sub>1</sub> by the roller 04; 06; 07; 08; 09; 11 that is adjustable<sub>1</sub> in terms of its contact pressure<sub>1</sub> on its adjacent rotational body 12; 13; 14; 16; 17 based upon its own mass. Thus<sub>1</sub> to each value FN11;

FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of one of the contact pressures, five additional values, which are comprised of the four radial forces Fn1; Fn2; Fn3; Fn4 and, if applicable, the mass of the adjustable roller 04; 06; 07; 08; 09; 11 are allocated. Furthermore, each value for a radial force Fn1; Fn2; Fn3; Fn4 can be subdivided to indicate its absolute value and its direction of action.

[039] The values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressures exerted in the roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, the values of the radial forces Fn1; Fn2; Fn3; Fn4 allocated to each of these, which are preferably subdivided into value and direction of action, and, if applicable, the mass of the adjustable roller 04; 06; 07; 08; 09; 11 are preferably stored in a memory device in the control unit. Also stored in the memory device of the control unit are preferably the value of the gravitational constants for calculating the force of weight from the mass of the adjustable roller 04; 06; 07; 08; 09; 11, and for each roller 04; 06; 07; 08; 09; 11 that is controllable, in terms of its contact pressure, a value for the distance from the center point of the roller 04; 06; 07; 08; 09; 11, which lies on its axis 19, to the center point of the respective adjacent rotational body 12; 13; 14; 16; 17 with which it is in direct contact. Each[, wherein each] value for one of these distances can be subdivided to provide an indication of its absolute value and of its spatial direction.

[040] In a[the] standard configuration, which is based upon the values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the



contact pressures that are stored in the memory device of the control unit, in the direct contact between rollers 04; 06; 07; 08; 09; 11 that are adjustable, in terms of their contact pressure, and rotational bodies 12; 13; 14; 16; 17, with the two being engaged on one another, a specific degree of flattening of the respective cylindrical circumferential surface of the roller 04; 06; 07; 08; 09; 11, the rotational body 12; 13; 14; 16; 17, or both results. A[, with the] chord of the flattened area, corresponding to the width of the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, [that] extends along the circumference of the roller 04; 06; 07; 08; 09; 11 or of the rotational body 12; 13; 14; 16; 17. The standard configuration generates a degree of flattening that corresponds to a specific target value for the width of each roller strip which is selected N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, in order to achieve a high quality of the printed product to be produced, using the printing couple 01 under standard operating conditions.

[041] In the case of operating conditions that deviate from the standard, for example, because the diameter of one of the rollers 04; 06; 07; 08; 09; 11, that is adjustable in terms of its contact pressure, or because the diameter of one of the rotational bodies 12; 13; 14; 16; 17, is expanded, such as, for example, due to a substance containment, and especially due to an absorption of moisture, or because the diameter has decreased as a result of wear, it is necessary to correct the width of a roller strip or of multiple roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 that has changed as a result of the change in diameter, until the width of each roller strip N11; N12; N21; N22; N31;

N32; N41; N42; N51; N52; N61; N62 again corresponds to its target value.

Alternatively, operating conditions may require that the width of each roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 be adjusted to a new target value. In both cases, the contact pressure exerted in each relevant roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 must be adjusted to a new value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62, which adjustment will necessitate that values for the radial forces  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$ , of the affected roller locks 21, be changed.

[042] The control unit is equipped with at least one control element and, with, for example, one display device for use in displaying one or more values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the contact pressure that is exerted in a specific roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62. The reference symbols for the roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, which have been chosen here by way of example, can also be used as identification codes for the roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, so that each roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 can be clearly identified by its identification code.

[043] By use of[With] the control element of the control unit, which control element is configured[designed], for example, as a button, as a keypad, or as a pointer instrument, a specific roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 can be selected, for example, from a list of all roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 in a

printing couple 01 that are provided with an identification code. Alternatively, or the identification code of a specific roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 can be input into the control unit via its control element. For each of these roller strips N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, at least for the standard configuration, a value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62, especially a target value, for the contact pressure exerted in the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 is stored in the memory device of the control unit. During the selection of, or during the input of the identification code for a specific roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 this value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 is displayed, such as, for example, numerically, alphanumerically, in a diagram, or in a pictogram on the display device, which display device is capable of displaying alphanumeric or graphic symbols.

[044] With the use of the control element, the displayed value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the contact pressure which is exerted in the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, is adjusted to a new value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the contact pressure exerted in the roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62. The, wherein the] displayed value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 is adjusted,

for example continuously or gradually, and preferably in stages of 10 % of the displayed value, by the control element. Alternatively, [Or] the control element is used to select a specific factor from a list of available factors by which the displayed value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 should be adjusted.

[045] For the new value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressure to be exerted in the selected roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, the control unit calculates the correct values for the radial forces Fn1; Fn2; Fn3; Fn4 to be exerted in the relevant roller lock 21 and/or for the new pressures to be set in the actuators 22, and stores the calculated values for these[the] radial forces Fn1; Fn2; Fn3; Fn4 and/or for these[the] pressures in its memory device. The control unit also controls the valves V15; V25; V35; V45; V55; V65, the proportional valves EP1; EP2; EP3; EP4 and the valves EP5; EP6. The calculation of the new values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 and/or the control of the valves V15; V25; V35; V45; V55; V65, the proportional valves EP1; EP2; EP3; EP4 and/or the valves EP5; EP6 is preferably implemented after the control unit has received a specific instruction to do so, which specific instruction can, for example, be input or selected via the control element.

[046] The calculation of the new values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the contact pressures takes into account the fact that these values and the radial forces Fn1; Fn2; Fn3; Fn4, in

their original levels, and their new levels, are each to be viewed as a vector quantity. Accordingly, the control unit uses suitable methods for calculating vector quantities. For instance, in addition to appropriate algebraic calculating methods, other methods, such as, for example, trigonometric calculating methods can also be used to calculate individual components of the respective vectors. In the calculation process, the control unit includes, to the degree necessary, its previously input, essentially unchangeable values, such as, for example, the respective mass of the adjustable rollers 04; 06; 07; 08; 09; 11 and the distance from the center of each roller 04; 06; 07; 08; 09; 11, that is adjustable in terms of its contact pressure, to the center of its respective adjacent rotational body 12; 13; 14; 16; 17. The result of the calculation can be displayed by the display device of the control unit, for example in the same manner as the original values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62.

[047] In order to set the new value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 for the contact pressure that is exerted in a selected roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, the control unit first uses at least one of the valves V15; V25; V35; V45; V55; V65 to actuate the fixation device of the specific roller lock 21 in which the radial force Fn1; Fn2; Fn3; Fn4 of at least one actuator 22 is to be adjusted to the calculated new value. The, so that the] adjustable roller 04; 06; 07; 08; 09; 11 that is seated in this roller lock 21 can now be radially displaced. The control unit then actuates at least one of the proportional valves EP1; EP2; EP3; EP4 and/or

at least one of the valves EP5; EP6 in order to adjust the radial force  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  of at least one actuator 22 in the respective roller lock 21 to the calculated new value. Afterward, the control unit again actuates the at least one valve V15; V25; V35; V45; V55; V65, that was actuated previously, [in order] to shift the fixation device of that roller lock 21, in which the radial force  $F_{n1}$ ;  $F_{n2}$ ;  $F_{n3}$ ;  $F_{n4}$  of at least one actuator 22 has been adjusted to the calculated new value, to the operational position, in which the roller 04; 06; 07; 08; 09; 11, that is adjustable in terms of its contact pressure and which is seated in this roller lock 21, can no longer be radially displaced. The new value  $FN_{11}$ ;  $FN_{12}$ ;  $FN_{21}$ ;  $FN_{22}$ ;  $FN_{31}$ ;  $FN_{32}$ ;  $FN_{41}$ ;  $FN_{42}$ ;  $FN_{51}$ ;  $FN_{52}$ ;  $FN_{61}$ ;  $FN_{62}$  for the contact pressure, which is exerted in a selected roller strip,  $N_{11}$ ;  $N_{12}$ ;  $N_{21}$ ;  $N_{22}$ ;  $N_{31}$ ;  $N_{32}$ ;  $N_{41}$ ;  $N_{42}$ ;  $N_{51}$ ;  $N_{52}$ ;  $N_{61}$ ;  $N_{62}$  also results in a change in the width of this roller strip  $N_{11}$ ;  $N_{12}$ ;  $N_{21}$ ;  $N_{22}$ ;  $N_{31}$ ;  $N_{32}$ ;  $N_{41}$ ;  $N_{42}$ ;  $N_{51}$ ;  $N_{52}$ ;  $N_{61}$ ;  $N_{62}$ .

[048] The above-described change in a value  $FN_{11}$ ;  $FN_{12}$ ;  $FN_{21}$ ;  $FN_{22}$ ;  $FN_{31}$ ;  $FN_{32}$ ;  $FN_{41}$ ;  $FN_{42}$ ;  $FN_{51}$ ;  $FN_{52}$ ;  $FN_{61}$ ;  $FN_{62}$  for the contact pressure exerted in a selected roller strip  $N_{11}$ ;  $N_{12}$ ;  $N_{21}$ ;  $N_{22}$ ;  $N_{31}$ ;  $N_{32}$ ;  $N_{41}$ ;  $N_{42}$ ;  $N_{51}$ ;  $N_{52}$ ;  $N_{61}$ ;  $N_{62}$  can be implemented for multiple rollers 04; 06; 07; 08; 09; 11, that are adjustable in terms of their contact pressure, either simultaneously or sequentially. For example, the values  $FN_{11}$ ;  $FN_{12}$ ;  $FN_{21}$ ;  $FN_{22}$ ;  $FN_{31}$ ;  $FN_{32}$  of all of the contact pressures exerted by the forme rollers 04; 06; 07, in other words the dampening forme roller 04 and the ink forme rollers 06; 07, can be changed at the same time. Alternatively, [Or] the value  $FN_{21}$ ;  $FN_{22}$ ;  $FN_{31}$ ;  $FN_{32}$ ;  $FN_{51}$ ;  $FN_{52}$ ;  $FN_{61}$ ;  $FN_{62}$  of all of the contact pressures which are exerted by the rollers

06; 07; 09; 11 of the inking unit 02, or the values[value] FN11; FN12; FN41; FN42 of all of the contact pressures which are exerted by the rollers 04; 08 of the dampening unit 03, or the values[value] FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressures of all of the rollers 04; 06; 07; 08; 09; 11 in the printing couple 01 can be changed at the same time. Thus, groups of simultaneously adjustable values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 can be formed. With the control unit, the values FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressures of all of the rollers 04; 06; 07; 08; 09; 11 that are to be adjusted, in terms of their contact pressure, such as, for example, those of an inking unit 02 and/or of a dampening unit 03, can be reset within a time period of less than one minute, and preferably can be reset within a period of a few seconds.

[049] Each[It can be provided that each] value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of the contact pressure exerted by a roller 04; 06; 07; 08; 09; 11, which[ that] has been changed once or even multiple times, for example via the control element in the control unit, to the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 that corresponds to the standard configuration, and especially to the target value for the contact pressure which is exerted in the corresponding roller strip, N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, can be reset.

[050] The control unit is configured[designed], for example, as a component of a control center that is part of the printing machine or that, at least, is a part of the

printing couple 01, and is thus [is] allocated to the printing machine or to the printing couple 01. As an alternative or in addition, the control unit can be configured[designed], for example, as a mobile component, such as, for example, as a notebook, which is connected to the controllable device that is actuated for the purpose of implementing such a[said] change, in other words particularly[especially] to the respective proportional valves EP1; EP2; EP3; EP4, to the valves EP5; EP6 and to the valves V15; V25; V35; V45; V55; V65, only when a value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure that is exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 is to be changed.

[051] To implement a change in the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure that is exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62, proof of authorization may be required. Accordingly[, wherein] prior to implementation of the change, for example, a recognizable password must be input into the control unit via its control element.

[052] The change in the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure that is exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 can be implemented during the rotation of the respective roller 04; 06; 07; 08; 09; 11. As long as at least one channel, with a preferably slot-shaped, continuous opening that extends in an axial direction along the forme cylinder 12, and over at least the width of at least one printing forme, and which channel is



configured[designed] to hold attachment hooks that are bent at the printing formes, is formed on the circumferential surface of the forme cylinder 12 in its axial direction, the change in the value FN11; FN21; FN31 of the contact pressure exerted in this roller strip N11; N21; N31 can occur[occurs] when the opening in the channel and the roller strip N11; N21; N31 have no common overlapping surface. This is to insure[, so] that during the setting of the new value of the contact pressure exerted in this roller strip N11; N21; N31, the roller 04; 06; 07 will not be pressed into the opening in the channel. Accordingly, the contact pressure, which is exerted in a roller strip N11; N21; N31, is changed by the control unit only at times during which the roller 04; 06; 07 that is to be displaced and/or that is to be adjusted in terms of its contact pressure, is rolling on the closed, customarily solidly configured[designed] portion of the circumferential surface of the forme cylinder 12 and/or on the surface of at least one printing forme that is mounted on the forme cylinder 12. During the rollover of the roller over the opening in the channel, the control unit blocks any change in the setting of the contact pressure which is exerted in the roller strip N11; N21; N31.

[053] To verify this condition, a sensor that registers the current angular position of the forme cylinder 12 and/or of the roller 04; 06; 07, such as a torque angle gauge, which transmits a signal corresponding to the current angular position to the control unit, can be attached to the forme cylinder and/or to the roller 04; 06; 07. The[, wherein the] control unit evaluates the transmitted[said] signal as a release signal which is indicating the permissibility of a change in the setting of a

contact pressure that is exerted in the roller strip N11; N21; N31. If the above condition cannot be fulfilled, or if it can be fulfilled only with complications, the forme cylinder 12 and the roller 04; 06; 07 in whose joint roller strip N11; N21; N31 the value FN11; FN21; FN31 of the contact pressure exerted therein is to be changed are placed in rotation, specifically at a speed at which a rollover of the opening in the channel by the roller 04; 06; 07 during the setting of the new value for its contact pressure exerted in this roller strip N11; N21; N31 will not produce a negative effect. The[, because the] duration of the rollover is very short, and thus will outweigh the effect of the inertia of the masses involved. Furthermore, the implementation of the change in the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 during the rotation of the respective roller 04; 06; 07; 08; 09; 11 also has the advantage of preventing slip-stick effects. The change in the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure which is exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52; N61; N62 is thus implemented during the rotation of the relevant roller 04; 06; 07; 08; 09; 11 and its respective adjacent rotational body 12; 13; 14; 16; 17 at a speed of, for example, [of ]at least 3,000 revolutions per hour, and preferably at a speed of at least 5,000 revolutions per hour or more. The implementation of the change in the value FN11; FN12; FN21; FN22; FN31; FN32; FN41; FN42; FN51; FN52; FN61; FN62 of a contact pressure which is exerted in a roller strip N11; N12; N21; N22; N31; N32; N41; N42; N51; N52;

N61; N62 can thus also take place when the printing couple 01 is running in production.

[054] While preferred embodiments of devices for adjusting contact pressure exerted on an adjacent rotational body by a roller in a roller strip and/or for engaging the roller on the rotational body and/or for disengaging the roller from the rotational body, in accordance with the present invention have been set forth fully and completely hereinafter, it will be apparent to one of skill in the art that various changes in, for example, the source of the compressed air or hydraulic fluid, the sizes of the cylinders and rollers, and the like could be made without departing from the true spirit and scope of the present invention, which is accordingly to be limited only by the appended claims.

WHAT IS CLAIMED IS:

## [List of Reference Symbols]

01	Printing couple
02	Inking unit
03	Dampening unit
04	Roller, dampening forme roller
05	-
06	Roller, ink forme roller
07	Roller, ink forme roller
08	Roller, intermediate roller
09	Roller, intermediate roller
10	-
11	Roller, intermediate roller
12	Rotational body, cylinder, forme cylinder
13	Rotational body, dampening distribution roller
14	Rotational body, dampening unit roller
15	-
16	Rotational body, ink transfer roller
17	Rotational body, inking unit roller
18	End (04; 06; 07; 08; 09; 11)
19	Axis (04; 06; 07; 08; 09; 11)
20	-
21	Support bearing, roller lock
22	Actuator
23	Frame holder
24	Roller holder
25	-
26	Multi-plate assembly
27	Multi-plate assembly
28	Channel
29	Pressure chamber
30	-
31	Pressure plate
32	Spring element
33	Plunger
34	Plunger head
35	-
36	Side frame
37	Sealing element
38	Surface (22), membrane
39	Roller mount
40	-
41	Pressure medium conduit]

[42 Pressure level

$\alpha$  Opening angle

EP1	Proportional valve 3/3-way proportional valve
EP2	Proportional valve, 3/3-way proportional valve
EP3	Proportional valve, 3/3-way proportional valve
EP4	Proportional valve, 3/3-way proportional valve
EP5	Valve, 5/2-way valve
EP6	Valve, 5/2-way valve

V15	Valve, 3/2-way valve
V25	Valve, 3/2-way valve
V35	Valve, 3/2-way valve
V45	Valve, 3/2-way valve
V55	Valve, 3/2-way valve
V65	Valve, 3/2-way valve

Fn1	Force, radial
Fn2	Force, radial
Fn3	Force, radial
Fn4	Force, radial

N11	Roller strip, nip-point
N12	Roller strip, nip-point
N21	Roller strip, nip-point
N22	Roller strip, nip-point
N31	Roller strip, nip-point
N32	Roller strip, nip-point
N41	Roller strip, nip-point
N42	Roller strip, nip-point
N51	Roller strip, nip-point
N52	Roller strip, nip-point
N61	Roller strip, nip-point
N62	Roller strip, nip-point]